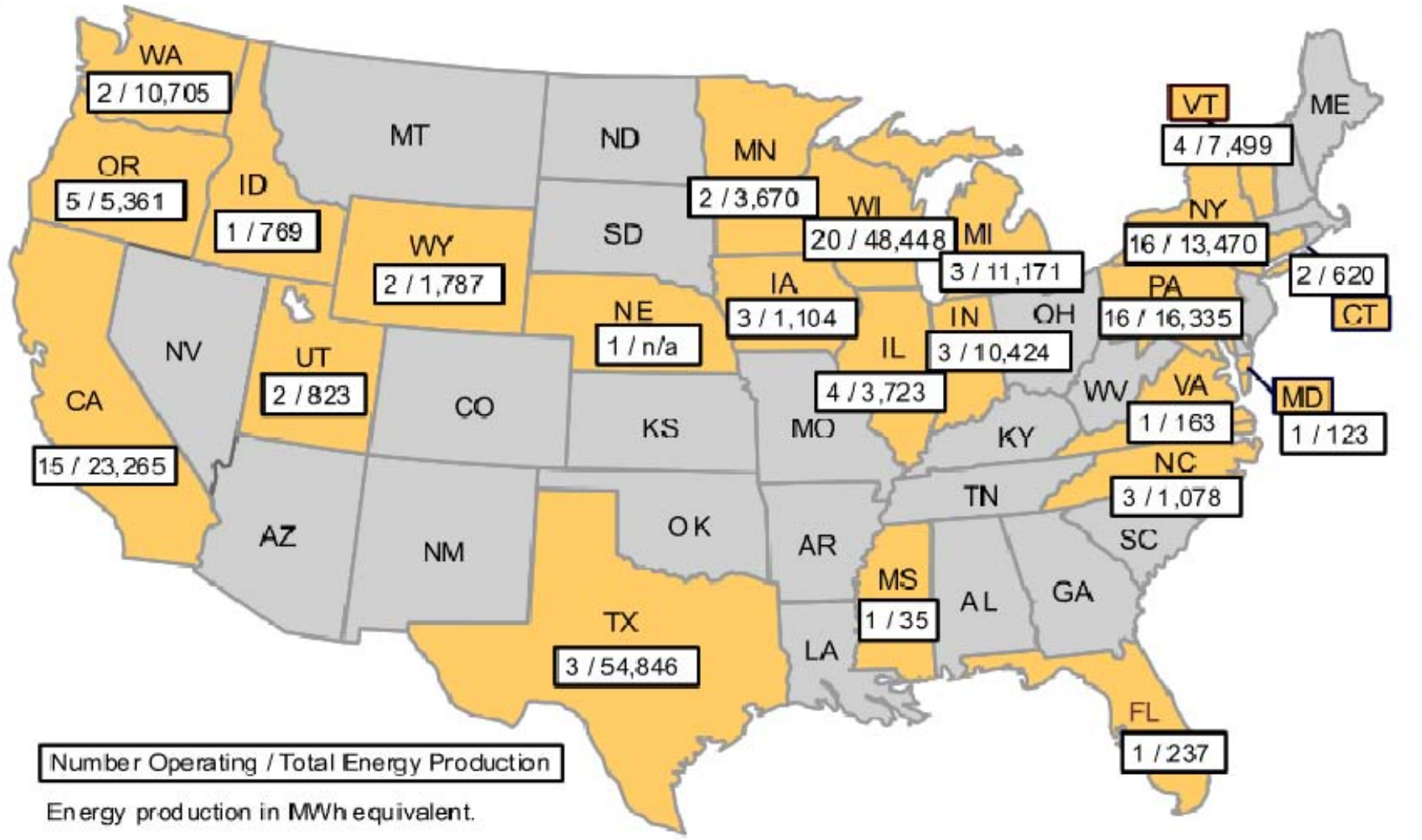
Anaerobic Digester Distribution

November 2007



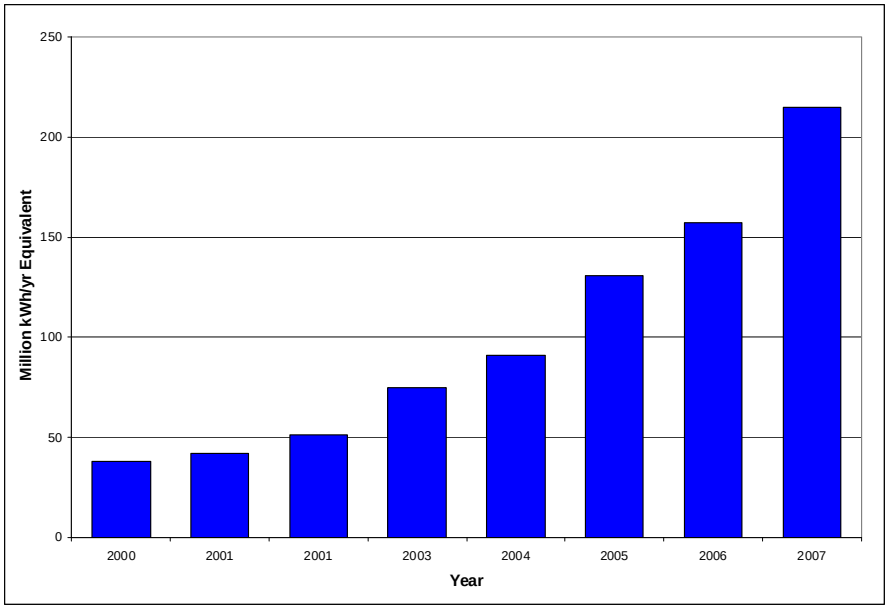


Figure 1. Trends in Energy Production by Anaerobic Digesters - 2000 through 2007

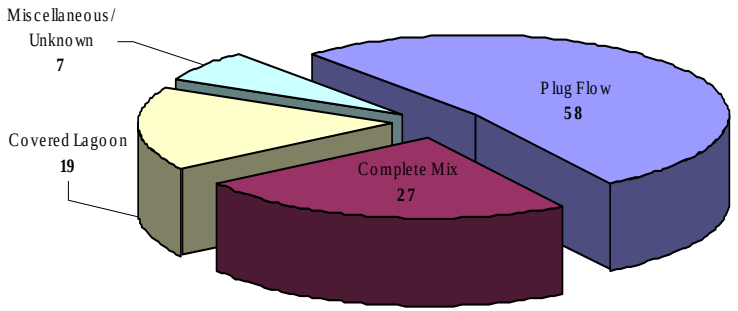


Figure 2. Number of Operating Anaerobic Digesters by Technology

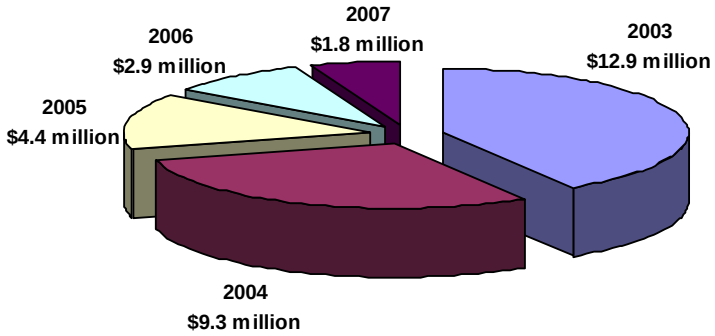


Figure 4. Annual USDA Funding for Anaerobic Digesters at Livestock Operations

U.S. Environmental Protection Agency

The AgSTAR Program

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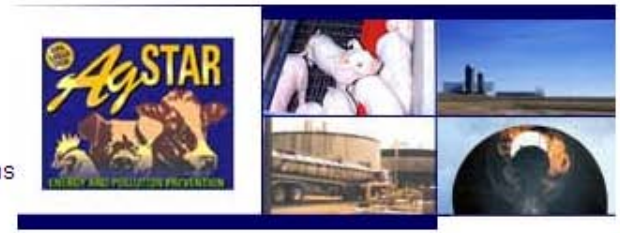
The AgSTAR Program is a voluntary effort jointly sponsored by the U.S. Environmental Protection Agency (EPA), the U.S. Department of Agriculture, and the U.S. Department of Energy. The program encourages the use of methane recovery (biogas) technologies at the confined animal feeding operations that manage manure as liquids or slurries. These technologies reduce methane emissions while achieving other environmental benefits.



The following links provide more information on the AgSTAR Program:

- Basic Information — Learn more about methane emissions from manure management and how the AgSTAR Program is working collaboratively with industry and other government organizations to reduce emissions.
- Accomplishments — Learn more about AgSTAR's successes in encouraging the adoption of anaerobic digestion technology .
- Experts — Identify appropriate designers, project developers, energy service providers, equipment manufacturers and distributors, and commodity organizations for developing anaerobic digestion technologies.
- Documents Tools, and Resources — Find publications and technical tools that provide more information on manure management and will assist you in developing anaerobic digestion projects.
- Workshops/Conferences — Learn more about upcoming events and activities.
- Guide to Operational Systems — Learn more about the status of farm-scale digesters currently operating at commercial livestock farms in the U.S.

Recent Additions

2007 Update on Operating Anaerobic Digester Systems (PDF, 2 pp., 174 KB, About PDF)

Updated Industry Directory

Fall 2007 AgSTAR Digest

U.S. EPA Celebrates Sonoma County's First Methane Digester

Performance Comparison of Scraped Dairy Manure Digesters Available (PDF, 8 pp., 127 KB)

Updated FarmWare version 3.1 released on September 7, 2007

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Experts

Interest in anaerobic digestion systems for livestock manure stabilization and energy production is accelerating. To help build on this forward momentum, the AgSTAR Program maintains two informational resources to further assist in the planning and development of digester systems.

Many of the sites listed on this page are not on the EPA Web site. Please see our disclaimer information. EXIT Disclaimer

Industry Directory

The Industry Directory for On-Farm Biogas Recovery Systems (PDF, 41 pp., 961 KB, About PDF) is intended to assist farm owners and others involved in developing anaerobic digestion technologies to identify designers, project developers, energy service providers, equipment manufacturers and distributors, and commodity organizations. If you are interested in being added to the Directory, please complete the online form.

Organizations

Organizations such as state energy offices, USDA field offices, university program, and non-government organizations can provide technical, financial, and planning assistance for the development of anaerobic digester systems and biogas utilization technologies.

Organization	Contact	Title	Phone	Organization Type	State
Agricultural Sustainability Institute, UC Davis	Tomich, Thomas (tptomich@ucdavis.edu)	Director	530-574-2503	University	CA
USDA Rural Development – California	Clendenin, Charles M (Chuck.Clendenin@ca.usda.gov)	Rural Energy Coordinator	530-792-5825	Government	CA
Western United Dairymen	March, Mike	CEO	209-527	NGO	CA

Industry Directory for On-Farm Biogas Recovery Systems

November 2007

AgSTAR Industry Directory 2007

Developers

GHD, Inc.

Steve Dvorak
P.O. Box 69
Chilton WI 53014

Tel: (920) 849-9797
Fax: (920) 849-9160
Email: corporate@ghdinc.net
WebSite: www.ghdinc.net

Year Established: 1985
# of Farm Projects: 30
# of Biogas Projects: 30

GHD provides engineering and system installation experience in the anaerobic digester industry. GHD has twenty-nine (29) operating anaerobic digesters utilizing its patented mixed plug flow digester design in the US and twelve (12) additional digesters under construction.

Hanusa Renewable Energy

Duane Hanusa
E 12678 Hwy W
Baraboo WI 53913

Tel: (608) 356-5078
Fax: N/A
Email: duanehanusa@gmail.com
WebSite: N/A

Year Established: 2004
# of Farm Projects: N/A
# of Biogas Projects: N/A

Worked for 4 years Developing Alliant Energy's Digester Program projects. Developed 4 farm projects. I felt there was a need for projects on smaller farms in the 150-500 cow range. I have designed a system that will cash flow at that level and started my own company.

U.S. Environmental Protection Agency

The AgSTAR Program

Newsroom

Online AgSTAR Digest

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Did You Know?

You can create a printable version of this Web page by clicking on "Print Version" in the navigation bar under the AgSTAR Program banner?

AgSTAR released FarmWare version 3.1 on September 7, 2007. FarmWare is an analytical tool designed to provide a preliminary assessment on the feasibility of integrating anaerobic digestion into an existing or planned manure management system. The new version contains updated computations for biogas energy generation and revenues from on-site electricity use. The software can be downloaded free at the AgSTAR Web site.

Welcome to the New AgSTAR Digest

AgSTAR has developed this web-based update to highlight recent news about digester projects and other items of interest in the field. Many of these articles are summaries of online news stories, with hyperlinks you can follow to the original sources. Through this update, we can also provide timely postings about applicable grants and calls for proposals, noteworthy events, and applicable regulatory policy changes. If you have any suggestions for items that could be included in a future issue or suggestions for improvements, please send an email to agstar@erg.com.

Anaerobic Digester Database

The Excel spreadsheets below provide basic information for anaerobic digester systems in the United States. The spreadsheets show projects in the following stages: planning, design, construction, startup, steady state, shutdown, and cancelled. Download XLS viewer.
EXIT Disclaimer

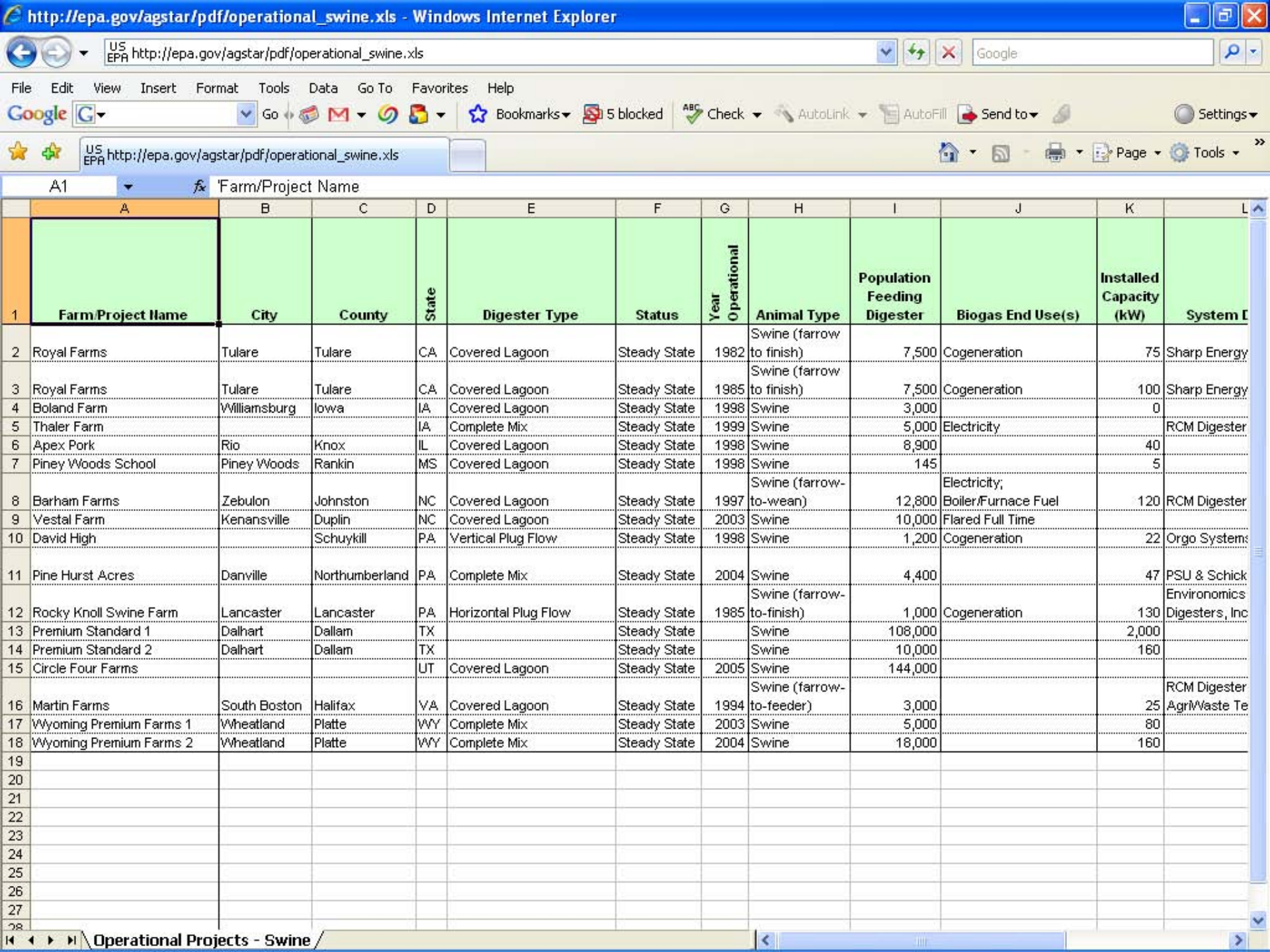
- Anaerobic digesters, sorted by operational status and by state (XLS, 82KB)
- Startup and steady state anaerobic digesters, sorted by state (XLS, 54KB)
  - Dairy projects (XLS, 47KB)
  - Swine projects (XLS, 25KB)
  - Beef cattle (XLS, 21KB)
  - Poultry (XLS, 22KB)

These data were compiled from a variety of sources. AgSTAR cannot guarantee the accuracy of these data. AgSTAR encourages farm operators, project developers, financers, and others involved in the development of farm digester projects to provide updates and corrections to these data by contacting AgSTAR.

Farm Project Profiles

Anaerobic digester systems can be installed successfully at commercial scale operations that collect manure as a liquid, slurry, or semi-solid. Existing farms use a variety of different types of digester designs and energy use technologies. Read profiles of successful anaerobic digester projects that are enjoying the environmental and economic benefits of incorporating anaerobic digesters into their manure management system.

- AA Dairy
- Barham Farms
- Gordondale Farms
- Haubenschild Farms
- Mason Dixon Farms
- Royal Farms



	A	B	C	D	E	F	G	H	I	J	K	L
1	Farm/Project Name	City	County	State	Digester Type	Status	Year Operational	Animal Type	Population Feeding Digester	Biogas End Use(s)	Installed Capacity (kW)	System D
2	Royal Farms	Tulare	Tulare	CA	Covered Lagoon	Steady State	1982	Swine (farrow to finish)	7,500	Cogeneration	75	Sharp Energy
3	Royal Farms	Tulare	Tulare	CA	Covered Lagoon	Steady State	1985	Swine (farrow to finish)	7,500	Cogeneration	100	Sharp Energy
4	Boland Farm	Williamsburg	Iowa	IA	Covered Lagoon	Steady State	1998	Swine	3,000		0	
5	Thaler Farm			IA	Complete Mix	Steady State	1999	Swine	5,000	Electricity		RCM Digester
6	Apex Pork	Rio	Knox	IL	Covered Lagoon	Steady State	1998	Swine	8,900		40	
7	Piney Woods School	Piney Woods	Rankin	MS	Covered Lagoon	Steady State	1998	Swine	145		5	
8	Barham Farms	Zebulon	Johnston	NC	Covered Lagoon	Steady State	1997	Swine (farrow-to-wean)	12,800	Electricity; Boiler/Furnace Fuel	120	RCM Digester
9	Vestal Farm	Kenansville	Duplin	NC	Covered Lagoon	Steady State	2003	Swine	10,000	Flared Full Time		
10	David High		Schuykill	PA	Vertical Plug Flow	Steady State	1998	Swine	1,200	Cogeneration	22	Orgo System
11	Pine Hurst Acres	Danville	Northumberland	PA	Complete Mix	Steady State	2004	Swine	4,400		47	PSU & Schick
12	Rocky Knoll Swine Farm	Lancaster	Lancaster	PA	Horizontal Plug Flow	Steady State	1985	Swine (farrow-to-finish)	1,000	Cogeneration	130	Environomics Digesters, Inc
13	Premium Standard 1	Dalhart	Dallam	TX		Steady State		Swine	108,000		2,000	
14	Premium Standard 2	Dalhart	Dallam	TX		Steady State		Swine	10,000		160	
15	Circle Four Farms			UT	Covered Lagoon	Steady State	2005	Swine	144,000			
16	Martin Farms	South Boston	Halifax	VA	Covered Lagoon	Steady State	1994	Swine (farrow-to-feeder)	3,000		25	RCM Digester AgriWaste Te
17	Wyoming Premium Farms 1	Wheatland	Platte	WY	Complete Mix	Steady State	2003	Swine	5,000		80	
18	Wyoming Premium Farms 2	Wheatland	Platte	WY	Complete Mix	Steady State	2004	Swine	18,000		160	
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AA Dairy Shares "Fields of Dreams"

Location	Candor, New York
Project Type	Farm scale
Animal Type	Dairy
Population	550 head milking herd
Baseline System	Pond
Digester Type	Horizontal plug flow
System Designer	RCM International, LLC
Biogas Use	Cogeneration
Generating Capacity	130 kW Caterpillar 3306
Receiving Utility	New York State Electric & Gas Corporation

Before installing its anaerobic digester in 1998, odors from AA Dairy's manure storage and spreading sites were an issue. With plans to double its size to 1,000 cows, AA needed a way to control odors more economically and manage manure more effectively. With installation of the 39,500 ft^3 plug flow digester, the farm not only increased its capacity and reduced odor, but also created revenue streams from electricity generation and sale of its "Fields of Dreams" compost.

Photo: RCM International, LLC

Designed to handle a capacity of 1,000 cows, the 112-foot digester currently receives approximately 8,600 gallons of manure each day from 550 cows. The manure, scraped from the freestall barn, includes newspaper, sawdust, and shavings that are used for bedding. A flexible cover captures the biogas produced, which is collected, filtered, and pressurized before fueling a 130 kW engine-generator set that produces enough power to operate the farm with excess sold to the local utility.

A screw press separator is used to separate the coarse fiber from the digester effluent, which is then composted and sold as "Fields of Dreams" compost for use as a soil amendment. It is essentially weed-free compost with a dry matter content of 20-30 percent and a pH of about 8. The farm sells various quantities from bagfulls to truckloads. Sale of the compost has helped offset the capital cost of the digester and reduces the rate of phosphorous application to the farm's cropland.